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1600

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/695,423

DATE: 01/30/2003

TIME: 13:24:06

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Output Set: N:\CRF4\01302003\I695423.raw

3 <110> APPLICANT: KATO, MASARU
 4 MIURA, YUTAKA
 5 KETTOKU, MASAKO
 6 IWAMATSU, AKIHIRO
 7 KOBAYASHI, KAZUO
 8 KOMEDA, TOSHIHIRO
 10 <120> TITLE OF INVENTION: NOVEL TRANSFERASE AND AMYLASE, PROCESS FOR PRODUCING
 11 THE ENZYMES, USE THEREOF, AND GENE CODING FOR THE SAME
 13 <130> FILE REFERENCE: 049441/0124
 15 <140> CURRENT APPLICATION NUMBER: 09/695,423
 C--> 16 <141> CURRENT FILING DATE: 2003-01-24
 18 <150> PRIOR APPLICATION NUMBER: 09/298,924
 19 <151> PRIOR FILING DATE: 1999-04-26
 21 <150> PRIOR APPLICATION NUMBER: 08/750,569
 22 <151> PRIOR FILING DATE: 1997-02-24
 24 <150> PRIOR APPLICATION NUMBER: PCT/JP95/01189
 25 <151> PRIOR FILING DATE: 1995-06-14
 27 <150> PRIOR APPLICATION NUMBER: JP 7-120673
 28 <151> PRIOR FILING DATE: 1995-04-21
 30 <150> PRIOR APPLICATION NUMBER: JP 6-311185
 31 <151> PRIOR FILING DATE: 1994-11-21
 33 <150> PRIOR APPLICATION NUMBER: JP 6-286917
 34 <151> PRIOR FILING DATE: 1994-11-21
 36 <150> PRIOR APPLICATION NUMBER: JP 6-290394
 37 <151> PRIOR FILING DATE: 1994-10-31
 39 <150> PRIOR APPLICATION NUMBER: JP 6-194223
 40 <151> PRIOR FILING DATE: 1994-08-18
 42 <150> PRIOR APPLICATION NUMBER: JP 6-133354
 43 <151> PRIOR FILING DATE: 1994-06-16
 45 <160> NUMBER OF SEQ ID NOS: 63
 47 <170> SOFTWARE: PatentIn Ver 2.1
 49 <210> SEQ ID NO: 1
 50 <211> LENGTH: 2578
 51 <212> TYPE: DNA
 52 <213> ORGANISM: *Sulfolobus solfataricus*
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 63 ttaacatcta tggagagaga attgcggatg attcattctt gataattctt aacgcaaatc 180
 65 ccaataacgt aaaagtgaag ttcccaaagg gtaaatggga actagttgtt ggttcttatt 240

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67 tgagagagat aaaaccagaa gaaagaattg tagaaggta gaaggaattg gaaattgagg 300
69 gaagaacagc attagttat aggaggacag aact atg ata ata ggc aca tat agg 355
70 Met Ile Ile Gly Thr Tyr Arg
71 1 5
73 ctg caa ctc aat aag aaa ttc act ttt tac gat ata ata gaa aat ttg 403
74 Leu Gln Leu Asn Lys Lys Phe Thr Phe Tyr Asp Ile Ile Glu Asn Leu
75 10 15 20
77 gat tat ttt aaa gaa tta gga gta tca cac cta tat cta tct cca ata 451
78 Asp Tyr Phe Lys Glu Leu Gly Val Ser His Leu Tyr Leu Ser Pro Ile
79 25 30 35
81 ctt aag gct aga cca ggg agc act cac ggc tac gat gta gta gat cat 499
82 Leu Lys Ala Arg Pro Gly Ser Thr His Gly Tyr Asp Val Val Asp His
83 40 45 50 55
85 agt gaa att aat gag gaa tta gga gga gaa gag ggg tgc ttt aaa cta 547
86 Ser Glu Ile Asn Glu Glu Leu Gly Gly Glu Gly Cys Phe Lys Leu
87 60 65 70
89 gtt aag gaa gct aag agt aga ggt tta gaa atc ata caa gat ata gtg 595
90 Val Lys Glu Ala Lys Ser Arg Gly Leu Glu Ile Ile Gln Asp Ile Val
91 75 80 85
93 cca aat cac atg gcg gta cat cat act aat tgg aga ctt atg gat ctg 643
94 Pro Asn His Met Ala Val His His Thr Asn Trp Arg Leu Met Asp Leu
95 90 95 100
97 tta aag agt tgg aag aat agt aaa tac tat aac tat ttt gat cac tac 691
98 Leu Lys Ser Trp Lys Asn Ser Lys Tyr Tyr Asn Tyr Phe Asp His Tyr
99 105 110 115
101 gat gat gac aag ata atc ctc cca ata ctt gag gac gag ttg gat acc 739
102 Asp Asp Asp Lys Ile Ile Leu Pro Ile Leu Glu Asp Glu Leu Asp Thr
103 120 125 130 135
105 gtt ata gat aag gga ttg ata aaa cta cag aag gat aat ata gag tac 787
106 Val Ile Asp Lys Gly Leu Ile Lys Leu Gln Lys Asp Asn Ile Glu Tyr
107 140 145 150
109 aga ggg ctt ata tta cct ata aat gat gaa gga gtt gaa ttc ttg aaa 835
110 Arg Gly Leu Ile Leu Pro Ile Asn Asp Glu Gly Val Glu Phe Leu Lys
111 155 160 165
113 agg att aat tgc ttt gat aat tca tgt tta aag aaa gag gat ata aag 883
114 Arg Ile Asn Cys Phe Asp Asn Ser Cys Leu Lys Lys Glu Asp Ile Lys
115 170 175 180
117 aaa tta cta tta ata caa tat tat cag cta act tac tgg aag aaa ggt 931
118 Lys Leu Leu Leu Ile Gln Tyr Tyr Gln Leu Thr Tyr Trp Lys Lys Gly
119 185 190 195
121 tat cca aac tat agg aga ttt ttc gca gta aat gat ttg ata gct gtt 979
122 Tyr Pro Asn Tyr Arg Arg Phe Phe Ala Val Asn Asp Leu Ile Ala Val
123 200 205 210 215
125 agg gta gaa ttg gat gaa gta ttt aga gag tcc cat gag ata att gct 1027
126 Arg Val Glu Leu Asp Glu Val Phe Arg Glu Ser His Glu Ile Ile Ala
127 220 225 230
129 aag cta cca gtt gac ggt tta aga att gac cac ata gat gga cta tat 1075
130 Lys Leu Pro Val Asp Gly Leu Arg Ile Asp His Ile Asp Gly Leu Tyr
131 235 240 245

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133 aac cct aag gag tat tta gat aag cta aga cag tta gta gga aat gat	1123
134 Asn Pro Lys Glu Tyr Leu Asp Lys Leu Arg Gln Leu Val Gly Asn Asp	
135 250 255 260	
137 aag ata ata tac gta gag aag ata ttg tca atc aac gag aaa tta aga	1171
138 Lys Ile Ile Tyr Val Glu Lys Ile Leu Ser Ile Asn Glu Lys Leu Arg	
139 265 270 275	
141 gat gat tgg aaa gta gat ggg act act gga tat gat ttc ttg aac tac	1219
142 Asp Asp Trp Lys Val Asp Gly Thr Thr Gly Tyr Asp Phe Leu Asn Tyr	
143 280 285 290 295	
145 gtt aat atg cta tta gta gat gga agt ggt gag gag gag tta act aag	1267
146 Val Asn Met Leu Leu Val Asp Gly Ser Gly Glu Glu Leu Thr Lys	
147 300 305 310	
149 ttt tat gag aat ttc att gga agg aaa atc aat ata gac gag tta ata	1315
150 Phe Tyr Glu Asn Phe Ile Gly Arg Lys Ile Asn Ile Asp Glu Leu Ile	
151 315 320 325	
153 ata caa agt aaa aaa tta gtt gca aat cag tta ttt aaa ggt gac att	1363
154 Ile Gln Ser Lys Lys Leu Val Ala Asn Gln Leu Phe Lys Gly Asp Ile	
155 330 335 340	
157 gaa aga tta agc aag tta ctg aac gtt aat tac gat tat tta gta gat	1411
158 Glu Arg Leu Ser Lys Leu Leu Asn Val Asn Tyr Asp Tyr Leu Val Asp	
159 345 350 355	
161 ttt cta gca tgt atg aaa aaa tac agg act tat tta cca tat gag gat	1459
162 Phe Leu Ala Cys Met Lys Lys Tyr Arg Thr Tyr Leu Pro Tyr Glu Asp	
163 360 365 370 375	
165 att aac gga ata agg gaa tgc gat aag gag gga aag tta aaa gat gaa	1507
166 Ile Asn Gly Ile Arg Glu Cys Asp Lys Glu Gly Lys Leu Lys Asp Glu	
167 380 385 390	
169 aag gga atc atg aga ctc caa caa tac atg cca gca atc ttc gct aag	1555
170 Lys Gly Ile Met Arg Leu Gln Gln Tyr Met Pro Ala Ile Phe Ala Lys	
171 395 400 405	
173 ggc tat gag gat act acc ctc ttc atc tac aat aga tta att tcc ctt	1603
174 Gly Tyr Glu Asp Thr Thr Leu Phe Ile Tyr Asn Arg Leu Ile Ser Leu	
175 410 415 420	
177 aac gag gtt ggg agc gac cta aga aga ttc agt tta agc atc aaa gac	1651
178 Asn Glu Val Gly Ser Asp Leu Arg Arg Phe Ser Leu Ser Ile Lys Asp	
179 425 430 435	
181 ttt cat aac ttt aac cta agc aga gta aat acc ata tca atg aac act	1699
182 Phe His Asn Phe Asn Leu Ser Arg Val Asn Thr Ile Ser Met Asn Thr	
183 440 445 450 455	
185 ctt tcc act cat gat act aaa ttc agt gaa gac gtt aga gct aga ata	1747
186 Leu Ser Thr His Asp Thr Lys Phe Ser Glu Asp Val Arg Ala Arg Ile	
187 460 465 470	
189 tca gta cta tct gag ata cca aag gag tgg gag gag agg gta ata tac	1795
190 Ser Val Leu Ser Glu Ile Pro Lys Glu Trp Glu Glu Arg Val Ile Tyr	
191 475 480 485	
193 tgg cat gat ttg tta agg cca aat att gat aaa aac gat gag tat aga	1843
194 Trp His Asp Leu Leu Arg Pro Asn Ile Asp Lys Asn Asp Glu Tyr Arg	
195 490 495 500	
197 ttt tat caa aca ctt gtg gga agt tac gag gga ttt gat aat aag gag	1891

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198	Phe	Tyr	Gln	Thr	Leu	Val	Gly	Ser	Tyr	Glu	Gly	Phe	Asp	Asn	Lys	Glu	
199	505				510					515							
201	aga	att	aag	aac	cac	atg	att	aag	gtc	ata	aga	gaa	gct	aag	gtt	cat	1939
202	Arg	Ile	Lys	Asn	His	Met	Ile	Lys	Val	Ile	Arg	Glu	Ala	Lys	Val	His	
203	520				525					530			535				
205	aca	acg	tgg	gaa	aat	cct	aat	ata	gag	tat	gaa	aag	aag	gtt	ctg	ggt	1987
206	Thr	Thr	Trp	Glu	Asn	Pro	Asn	Ile	Glu	Tyr	Glu	Lys	Lys	Val	Leu	Gly	
207					540					545			550				
209	ttc	ata	gat	gaa	gtg	ttc	gag	aac	agt	aat	ttt	aga	aat	gat	ttt	gaa	2035
210	Phe	Ile	Asp	Glu	Val	Phe	Glu	Asn	Ser	Asn	Phe	Arg	Asn	Asp	Phe	Glu	
211					555					560			565				
213	aat	ttt	gaa	aag	aaa	ata	gtt	tat	ttc	ggt	tat	atg	aaa	tca	tta	atc	2083
214	Asn	Phe	Glu	Lys	Lys	Ile	Val	Tyr	Phe	Gly	Tyr	Met	Lys	Ser	Leu	Ile	
215					570					575			580				
217	gca	acg	aca	ctt	agg	ttc	ctt	tcg	ccc	ggt	gta	cca	gat	att	tat	caa	2131
218	Ala	Thr	Thr	Leu	Arg	Phe	Leu	Ser	Pro	Gly	Val	Pro	Asp	Ile	Tyr	Gln	
219					585					590			595				
221	gga	act	gaa	gtt	tgg	aga	ttc	tta	ctt	aca	gac	cca	gat	aac	aga	atg	2179
222	Gly	Thr	Glu	Val	Trp	Arg	Phe	Leu	Leu	Thr	Asp	Pro	Asp	Asn	Arg	Met	
223					600					605			610			615	
225	ccg	gtg	gat	ttc	aag	aaa	cta	aag	gaa	tta	tta	aat	aat	ttg	act	gaa	2227
226	Pro	Val	Asp	Phe	Lys	Lys	Leu	Lys	Glu	Leu	Leu	Asn	Asn	Leu	Thr	Glu	
227					620					625			630				
229	aag	aac	tta	gaa	ctc	tca	gat	cca	aga	gtc	aaa	atg	tta	tat	gtt	aag	2275
230	Lys	Asn	Leu	Glu	Leu	Ser	Asp	Pro	Arg	Val	Lys	Met	Leu	Tyr	Val	Lys	
231					635					640			645				
233	aaa	ttg	cta	cag	ctt	aga	aga	gag	tac	tca	cta	aac	gat	tat	aaa	cca	2323
234	Lys	Leu	Leu	Gln	Leu	Arg	Arg	Glu	Tyr	Ser	Leu	Asn	Asp	Tyr	Lys	Pro	
235					650					655			660				
237	ttg	ccc	ttt	ggc	ttc	caa	agg	gga	aaa	gta	gct	gtc	ctt	ttc	tca	cca	2371
238	Leu	Pro	Phe	Gly	Phe	Gln	Arg	Gly	Lys	Val	Ala	Val	Leu	Phe	Ser	Pro	
239					665					670			675				
241	ata	gtg	act	agg	gag	gtt	aaa	gag	aaa	att	agt	ata	agg	caa	aaa	agc	2419
242	Ile	Val	Thr	Arg	Glu	Val	Lys	Glu	Lys	Ile	Ser	Ile	Arg	Gln	Lys	Ser	
243					680					685			690			695	
245	gtt	gat	tgg	atc	aga	aat	gag	gaa	att	agt	agt	gga	gaa	tac	aat	tta	2467
246	Val	Asp	Trp	Ile	Arg	Asn	Glu	Glu	Ile	Ser	Ser	Gly	Glu	Tyr	Asn	Leu	
247					700					705			710				
249	agt	gag	ttg	att	ggg	aag	cat	aaa	gtc	gtt	ata	tta	act	gaa	aaa	agg	2515
250	Ser	Glu	Leu	Ile	Gly	Lys	His	Lys	Val	Val	Ile	Leu	Thr	Glu	Lys	Arg	
251					715					720			725				
253	gag	tgaactacct	acatagattt	attcttgaac	tactctggtc	agaaaatgtat											2568
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265 Met Ile Ile Gly Thr Tyr Arg Leu Gln Leu Asn Lys Lys Phe Thr Phe
 266 1 5 10 15
 268 Tyr Asp Ile Ile Glu Asn Leu Asp Tyr Phe Lys Glu Leu Gly Val Ser
 269 20 25 30
 271 His Leu Tyr Leu Ser Pro Ile Leu Lys Ala Arg Pro Gly Ser Thr His
 272 35 40 45
 274 Gly Tyr Asp Val Val Asp His Ser Glu Ile Asn Glu Glu Leu Gly Gly
 275 50 55 60
 277 Glu Glu Gly Cys Phe Lys Leu Val Lys Glu Ala Lys Ser Arg Gly Leu
 278 65 70 75 80
 280 Glu Ile Ile Gln Asp Ile Val Pro Asn His Met Ala Val His His Thr
 281 85 90 95
 283 Asn Trp Arg Leu Met Asp Leu Leu Lys Ser Trp Lys Asn Ser Lys Tyr
 284 100 105 110
 286 Tyr Asn Tyr Phe Asp His Tyr Asp Asp Lys Ile Ile Leu Pro Ile
 287 115 120 125
 289 Leu Glu Asp Glu Leu Asp Thr Val Ile Asp Lys Gly Leu Ile Lys Leu
 290 130 135 140
 292 Gln Lys Asp Asn Ile Glu Tyr Arg Gly Leu Ile Leu Pro Ile Asn Asp
 293 145 150 155 160
 295 Glu Gly Val Glu Phe Leu Lys Arg Ile Asn Cys Phe Asp Asn Ser Cys
 296 165 170 175
 298 Leu Lys Lys Glu Asp Ile Lys Lys Leu Leu Leu Ile Gln Tyr Tyr Gln
 299 180 185 190
 301 Leu Thr Tyr Trp Lys Lys Gly Tyr Pro Asn Tyr Arg Arg Phe Phe Ala
 302 195 200 205
 304 Val Asn Asp Leu Ile Ala Val Arg Val Glu Leu Asp Glu Val Phe Arg
 305 210 215 220
 307 Glu Ser His Glu Ile Ile Ala Lys Leu Pro Val Asp Gly Leu Arg Ile
 308 225 230 235 240
 310 Asp His Ile Asp Gly Leu Tyr Asn Pro Lys Glu Tyr Leu Asp Lys Leu
 311 245 250 255
 313 Arg Gln Leu Val Gly Asn Asp Lys Ile Ile Tyr Val Glu Lys Ile Leu
 314 260 265 270
 316 Ser Ile Asn Glu Lys Leu Arg Asp Asp Trp Lys Val Asp Gly Thr Thr
 317 275 280 285
 319 Gly Tyr Asp Phe Leu Asn Tyr Val Asn Met Leu Leu Val Asp Gly Ser
 320 290 295 300
 322 Gly Glu Glu Glu Leu Thr Lys Phe Tyr Glu Asn Phe Ile Gly Arg Lys
 323 305 310 315 320
 325 Ile Asn Ile Asp Glu Leu Ile Ile Gln Ser Lys Lys Leu Val Ala Asn
 326 325 330 335
 328 Gln Leu Phe Lys Gly Asp Ile Glu Arg Leu Ser Lys Leu Asn Val
 329 340 345 350
 331 Asn Tyr Asp Tyr Leu Val Asp Phe Leu Ala Cys Met Lys Lys Tyr Arg
 332 355 360 365
 334 Thr Tyr Leu Pro Tyr Glu Asp Ile Asn Gly Ile Arg Glu Cys Asp Lys
 335 370 375 380
 337 Glu Gly Lys Leu Lys Asp Glu Lys Gly Ile Met Arg Leu Gln Gln Tyr

VERIFICATION SUMMARY

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L:16 M:271 C: Current Filing Date differs, Replaced Current Filing Date